93

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Report on Forest Insects Surveys for 1932
Yosemite National Park
California

Scope of the Report

The great increase in the number of trees attacked in Yosemite National Park by insects during the years of 1930, 1931, and the spring of 1932, emphasized the need for a comprehensive survey of the losses sustained. Accordingly, a survey of the insect infestation on approximately 100,000 acres of timber believed to be in the susceptible types was initiated on the 12th of May and continued throughout the entire summer of 1932 with minor interruptions. The survey was carried out under the "Proposed Plans for Forest Insect Surveys, Yosemite National Park, Season of 1932," outlined by Mr. John M. Miller, Senior Entomologist, Bureau of Entomology, Department of Agriculture. This was supplemented by another outline prepared by Dr. Kenneth Salman, also of the Bureau. The plans helped materially in organizing the survey and obtaining the necessary data in the shortest possible time. The bulk of the survey centered in the Ponderosa (Yellow) and Sugar Pine lands along the southern and western boundaries of Yosemite National Park from the Mariposa Grove of Big Trees to the drainage of Cherry Creek in the Lake Eleanor region. Some time was given to the Jeffrey and Lodgepole Pine areas where conditions were found to be endemic. The Jeffrey Pine areas included the Little Yosemite Valley, Illilouette Creek, portions of the rim of Yosemite Valley itself, and other small areas. Only certain areas considered to be indicative of the conditions obtaining in the Lodgepole Pine type, such as Tenaya Lake, Tuolumne Meadows, and the Glacier Point Road, were covered during the survey.

Objects of the Survey

According to Mr. Miller, the primary purpose of the survey was to secure the basic data for an appraisal of the conditions as they may exist toward the close of the 1932 season. This basic data was to be found in an estimate of the amount of losses incurred in the years of 1930, 1931, and the portion of the year 1932 taken to complete the survey. A follow-up will take place in the early fall of 1932 to pick up the losses for 1932. The information obtained from the survey and the follow-up of the fall will be the basis for the fall of 1932 and spring of 1933 control estimates. The secondary and very important object for the future control estimates was the inauguration of a series of permanent sample plots of approximately 320 acres each situated in indicative types and areas. Ten such plots varying from 80 acres to 2,700 acres were set up, so scattered along the boundaries of the Park as to give a good indication of what the insect infestation tendencies may be at any time. It is necessary that the plots so selected be systematically covered at least once each year in order to obtain the maximum of results over an extended period of time.

In conjunction with the survey and forming part of it was the preparation of a type map showing the location and the extent of the susceptible and non-susceptible types of timber. The type map will form the basis for the division of the Park lands into areas of varying degrees of hazardness from the entomological viewpoint. The entomological units or areas so determined will then be divided or incorporated into insect control units necessary for the greatest efficiency in control work. Type mapping was concentrated on the areas of susceptible types in an extensive manner, no attention being paid to the sample plot portion of correct type mapping procedure. The reason for this was the large amount of territory to be covered in the time allotted.

Methods of the Survey

Three systems of obtaining data were used. One, an intensive method of 100 per cent cruises of sample plots; and the other two, extensive methods involving the viewing and counting of the trees observed. The intensive method selected areas preferably of 320 acres each situated in indicative localities. Ten such plots were selected, ranging from 80 acres up to 2,700 acres in size. The two larger plots of 1,660 and 2,700 acres were considered as plots because the intensive use to which they are put necessitates their being cruised 100 per cent. Each plot has been tied into some definite landmark and can be readily picked up for future cruises. A record was taken of all trees infested either top or totally killed. Top-killed are trees that have been attacked by insects that did not kill the entire tree but left the lower portion alive. In many cases the tree will overcome the loss of the top and remain healthy for a long period of time. In other cases of top-killed trees, later attacks of either the same insect responsible for the top-killing or some secondary insect will complete the killing. The records took into consideration the year of attack, along with the insect responsible if determinable. The presence of eggs, larvae, pupae, and adults was also recorded. Green cruises, for the purpose of estimating the percentage of the stand infested, were taken where no information existed for the stands.

One of the extensive methods consisted of topographic viewing from points of vantage selected as the work progressed. These points have been referenced to a topographic map of the Park and can be readily located. Counts were made with a powerful pair of stand binoculars in the custody of the Yosemite Museum. The 20-power eyepieces were used and found to give the best results. The limitation of this method is that it must be coordinated with cruises on the ground to determine the factor of correction. This method supplements the intensive system and should form part of it when insect infestation estimates are made for Yosemite National Park.

The other extensive method was to make trail and roadside counts a certain specified distance, usually one chain wide. This also supplements the intensive method and is a fairly reliable indicator of the conditions existing. This method is of particular value in the Lodgepole Pine stands where infestations involve great numbers of trees.

Responsible Agents

The most important insects doing the damage in Yosemite National Park are members of the genus Dendroctonus, the Bark Beetles. They are in particular the Western Pine Beetle (D. brevicomis), the Mountain Pine Beetle (D. monticolae), the Red Turpentine Beetle (D. valens), and the Jeffrey Pine Beetle (D. jeffreyi). The Ponderosa Pine has been severely hit by the Western Pine Beetle, as has the Sugar Pine by the Mountain Pine Beetle. The losses from the Mountain Pine Beetle in Lodgepole Pine is of little consequence at the present time. The Jeffrey Pine Beetle has not been observed as being greatly on the increase and can be left alone for the present time. The fall estimates should show us the true conditions in this case. The Red Turpentine Beetle has as far as been observed not been responsible for any killing.

Members of the genus Ips have been responsible for considerable top-killing and also considerable killing of trees of the smaller diameter classes. It seems as if the losses from this Beetle are on the decrease. Initial attacks of Ips in the larger trees are often followed by killing attacks of members of the genus Dendroctonus.

The genus Melanophila has usually been considered in the follow-up or secondary class of insects. The Ponderosa Pine in Yosemite Valley shows the presence of a large number of these insects in the many top-killed over-mature trees that have finally succumbed to later attacks of Dendroctonus brevicomis. The Flatheads or Melanophila have done considerable damage in the Douglas Fir in Yosemite Valley and at Hetch Hetchy. Approximately 200 trees were observed to have been killed in the last year on the slopes near Happy Isles and Mirror Lake. The importance of the trees in these areas from the scenic standpoint will compel us to take control measures against the Flatheads if there is no noticeable improvement in the very near future.

Areas in the Survey

Eleven divisions covering all of the critical portions of the Park were examined in the course of the survey. The following conditions were found to be existing at the time. The divisions are given in the order of their relative importance from both the entomological and scenic or use view-points. Big Meadows may seem a little out of place but it is believed to hold the key to the infestation in Yosemite Valley itself.

Yosemite Valley Unit

This unit shows a loss of approximately 1 per cent of the stand. The Ponderosa Pine forms the timber type being practically pure. Although spotting and control operations have gone on for years, there is a decided increase in the intensity of attack. Spotting and control operations have been carried on in the Valley since June 8; 192 trees have been spotted to date with approximately 50 trees treated. As long as the infestation is allowed to run at Big Meadows, the infestation of Ponderosa Pine in Yosemite

Valley and along the Big Oak Flat Road will continue at the present rate with all the possibility of a more marked increase in the number of trees attacked. It is estimated that if the infestation had been allowed to run unchecked in Yosemite Valley the loss would now amount to very close to 3 per cent of the stand. So far, for the season of 1932, 103 trees have been recorded as attacked with an additional 41 top-killed trees, some of which will be killed in the near future. Ranger Merrill in his observations made in October, 1931, estimated that there were 80 trees attacked in the Valley up to that time. It must be remembered that the losses for this year are as yet very incomplete as new attacks should take place between now and the middle of October. The most disheartening observation in the Valley has been the attack on the Giant Yellow Pine, one of the most interesting trees in the entire Yosemite National Park.

Another problem of importance in this unit is the heavy attack taking place in the Douglas Fir on the slopes above the Valley Floor, particularly in the Happy Isles and Mirror Lake regions. The insect responsible is a Flathead Borer believed to be Melanophila drummondii. Control operations have never been taken against this type of infestation in the Park. If no decrease takes place, control operations will have to take place. Some 200 trees were found to be infested in a count taken in the middle of June. Control measures may have to be instituted against this insect because of the great scenic value of the trees in these intensely used areas.

Big Meadows Unit

The permanent sample plot of 320 acres set up in the Big Meadows unit shows a loss for the stand of 400 trees. This loss occurred in the years of 1930, 1931, and 1932 up to the first week of July. Only a small portion of the 1932 season is thus represented. This will be a little high for the entire Big Meadows unit but it is indicative of what is taking place in certain restricted portions in this unit. The slope south of Foresta, partially within the Park and partially without, is as great, if not greater, as a topographic view of part of the Foresta slope shows a loss of at least 75 per cent of the stand. This slope is an extremely poor site and would entail some difficulty in carrying out control operations. Nevertheless, it is a serious threat to all of the timber adjacent. The Big Meadows unit is the key to the Big Oak Flat Road and Yosemite Valley units. With this unit reduced to the endemic stage, the losses on the Big Oak Flat and Yosemite Valley units should be negligible. Big Meadows itself makes an ideal control unit and should be gone over in the very near future, the spring of 1933 at the latest. Ranger Merrill estimated the loss in his report for the Big Meadows and Cascades Basin units at 400. The latest estimates place the losses for the same units at 1,200 trees. The Cascades Basin unit includes the Big Oak Flat unit. The fire of July, 1931, has had a good deal to do with the great increase at Big Meadows, observations showing that nearly all of the trees damaged by the fire have since been attacked by the Western Pine Beetle.

Mariposa Grove of Big Trees Unit

The attack in the Mariposa Grove of Big Trees has been endemic so far but is decidedly on the increase. The Sugar Pine has in the aggregate sustained some large losses. 425,000 feet Board Measure were treated in the spring control operations of 1932 in a total of 90 trees. The loss is equivalent to less than 1 per cent of the stand but should not be tolerated in an area so intensively used by the public. The best part of the losses is not discernible to the public, but the losses one sees as he enters the Grove is sufficient to justify control operations. A glance at the picture taken near the Grove entrance is not very heartening. It is evident that the spring control operations did considerable good in slowing up the rate of attack. A number of trees have shown up during the summer and due to the very high use value of this unit these new infested trees should be cleaned out this fall.

Wawona Basin Unit

The timber in the Wawona Basin is practically pure Ponderosa Pine with a varying low admixture of Sugar Pine. The infestation has made its greatest gains on these lands and has been in the epidemic stage for some time. The losses are too great for the Park to long accept. At present, they do not compare with the tremendous losses to the south on the Sierra National Forest where in a certain Blue Canyon the loss has been 65 per cent of the stand of merchantable timber. With the Wawona lands now in the Park, control operations are imperative either this fall or next spring. A permanent sample plot will be installed on these lands sometime in September.

Wawona Road

Two sample plots along the Wawona Road, one at the Black Rascal in the Eleven Mile region and one in the Grouse Creek region, have been installed. They will tend to indicate what is taking place along the entire Wawona Road. The Black Rascal plot has a loss of 38 trees, indicating a volume loss for the stand of 1 per cent. There have been some large group attacks in this region, one such group close to this plot having 22 trees, both Ponderosa and Sugar Pines of large size, attacked in the small space of one acre. The stand loss here is not so great as to occasion much alarm, but the entire Wawona Road should not take any loss at all if it is possible to eliminate it. The intensive use of this road compels control work taking place with the slightest increase in the rate of infestation. The increase in infestation is markedly apparent although it does entail only a small percentage of the stand. The Sugar Pine in the Alder Creek Basin has reached the epidemic stage and will need control operations either this fall or next spring. The Black Rascal plot will indicate what is taking place in the timber types along the Wawona Road having Sugar Pine as the most important species.

The Grouse Creek plot has sustained losses so far for the 1932 season that are negligible, only one tree having shown up. Whether the control operations on this plot in the last two springs have had a lot to do with this very evident decrease is open to question. This plot was moderately infested in 1930 and heavily infested in 1931; thus far this season, the losses are remarkably small. The plot was thoroughly gone over in the spring of 1932, approximately 60 trees being treated. The cruise of this plot took place in the last week of August.

Rockefeller Purchase

Two plots, one a mile below Aspen Valley Checking Station and the other in the Ackerson Meadows region, were set up in the Rockefeller Purchase lands. The first plot, 320 acres in size, is one of the many in the Bureau of Entomology's series of sample plots scattered throughout Region 5 of the Forest Service with the purpose of showing the insect infestation tendencies prevalent in the entire Region. Ponderosa Pine shows a loss of 1 7/10 per cent, Sugar Pine a loss of 5 1/2 per cent with the infestation on the increase. The Rockefeller Purchase lands have sustained a very large loss in the aggregate when one considers the loss of 319,000 feet alone for this 320 acres. The average for the 320 acres is 1,000 feet Board Measure per acre, a figure too large for the Park to tolerate. No stand can long sustain such losses without the type changing radically. The lands were purchased for being the finest examples of the Sugar Pine type in a large block as yet untouched by the logger. Some $3,000,000 was spent in the purchase of these lands and, if the figure for these 320 acres is true of the entire Purchase, 5 per cent of the investment has already been lost to the insects. 5 per cent of $3,000,000 is $150,000, five times the amount necessary to control the inroads now taking place in the entire Yosemite National Park.

The second plot of 80 acres is in the Ackerson Meadows region on the west slopes of Bald Mountain. This plot shows a loss in the Ponderosa Pine of 3 per cent of the stand with the infestation on the increase. Control work should take place here before the infestation spreads further north.

Hetch Hetchy, Lake Eleanor, and Cherry Valley

Hetch Hetchy is taking a little better than normal losses, being evidently a slopover from the infestation present in the Rockefeller lands to the south. Some Douglas Fir at Damsite is undergoing the same intensive attack of Flathead Borers as the Douglas Fir in Yosemite Valley. Approximately 75 trees are infested. The Lake Eleanor and Cherry Valley regions are in fine shape; only one group infestation some two miles from Cherry Valley was observed.

Tuolumne Meadows

An extensive survey was made of the Lodgepole Pine type in the Tuolumne Meadows and Tenaya Lake regions. No infestation of any consequence was found. A permanent sample strip one mile long and five chains wide in the old attack belt at Tuolumne Meadows showed a loss of only five trees for the 1932 season.

Glen Aulin, Virginia Canyon, Burro Pass

Trail counts made while on patrol by Ranger Caster showed endemic conditions existing in these regions. The following tabulation will show the counts as obtained in the Lodgepole stands in this area. Ranger Caster reports the tendency to group up.

Tuolumne Meadows to Glen Aulin	8 1/2 miles	49 trees
Glen Aulin to Cold Canyon	9 1/2 miles	57 trees
Smedburg Lake trail to Burro Pass	6 miles	27 trees
Virginia Canyon to Summit Pass and Virginia Pass	7 1/2 miles	37 trees

This gives a total of 170 trees in 28 1/2 miles of trail counted. The instructions to the Ranger were to count a strip alongside, on one side of the trail, for a distance of one chain.

Little Yosemite and Illilouette Canyon

Trail counts in the Little Yosemite showed that the region was taking normal or less than normal losses. The same was found to be true of the Illilouette Canyon from topographic view counts taken from Glacier Point Lookout.

Snow Creek

Snow Creek topographic view counts showed the drainage to be in good shape except for a small group infestation in the Lodgepole Pine in the Porcupine Creek campgrounds.

Glacier Point Road

A road strip count along the Glacier Point Road to Bridalveil Creek gave a count of 44 Lodgepole Pine infested for the season of 1932 to the middle of July. This road strip is about 7 miles long and would indicate a normal or less than normal loss taking place in the Lodgepole Pine.

Conclusions

The survey has shown that there are enormous losses taking place in the Ponderosa and Sugar Pine types. The infestation has very greatly increased all along the southern and western boundaries of the Park. From all

indications, it is still on the increase. Whether the rate of increase has been maintained throughout the summer of 1932 is a question that will be settled when the fall survey figures are collected and computed. From all indications, the heaviest infestation is on the south around Wawona. It seems as if the percentage of infestation is greatest in the southern part of the Park and is progressing northward. The Sierra National Forest is sustaining losses ten times as great as any Park has sustained.. With the infestation spreading in intensity into the Park, the losses so far sustained will be pitifully small. There is a very remote possibility that the rate of increase will show a marked decline. Even with such a decline the Park is at present losing too much beautiful timber to the insects to wait for such a decline to take place. The Park can not sustain a loss of 65 per cent of the stand in any one area, such as has taken place in the Sierra National Forest in Blue Canyon.

The greatest value of this survey may not be immediately apparent because of the relatively short space of time covered in the record of losses. To obtain the maximum of results on this mere beginning insect infestation, surveys will be necessary at least once each year on all of the permanent sample plots established. Records are of the greatest value when they cover an unbroken series. Any break in this series of records will tend to distort the conclusions. In periods of endemic infestations of little consequence the fall survey will be sufficient to keep unimpaired the series of losses recorded. The losses will occur every year, some years will be large and others small, and it is this fact properly recorded that may hold the key to prophesying the return of epidemic conditions.

Permanent Sample Plot

Viewpoint and its number

Area viewed

Unseen

Arrow points points to area

Chart Number One

Per Cent of Stand Infested

This chart shows the percentages of infestation computed from the data gathered on the ten individual permanent sample plots. Each square represents 1/4 of 1 per cent volume in board feet infested.

The bar for Yellow Pine (Ponderosa Pine) is the per cent of the Yellow Pine found infested on the area in all classes both totally killed and top-killed. It includes in some cases the losses as determinable for 1930, 1931, and a part of 1932. In other cases, only the losses for 1931 and a fair part of 1932 are shown. The difficulty of picking up old losses is progressively harder as each succeeding season advances. This is the reason for the apparent unconformity. The bar for the Sugar Pine is on the same basis. But the bar for the entire stand compares the infestation with the entire stand, including other non-susceptible species such as White Fir, Douglas Fir, and Incense Cedar.

The percentages were arrived at by comparing stand cruises with the infested volumes found per acre. The areas upon which these percentages were found represent 5 per cent of the estimated 100,000 acres of the susceptible types. The chart is a very good picture of what is occurring in the Ponderosa and Sugar Pine areas of Yosemite National Park.

(Chart on following page)

INSECT INFESTATION & SU
YOSEMITE NATIONAL PARK, CA
August, 1932.

PERCENT OF STAND INFESTED

0.0 2.5 5.0 7.5 10.0 12.5 15.0 17.5 20.0

	Yosemite Valley	Big Meadows	Mariposa Grove	Sect 6 Wawona Strip	Black Rascal	Grouse Creek	Aspen Valley	Ackerson Meadows	Tuolumne Meadows
Yellow Pine									
Sugar "									
Entire Stand									
Yellow Pine									
Sugar "									
Entire Stand									
Yellow Pine									
Sugar "									
Entire Stand									
Yellow Pine									
Sugar "									
Entire Stand									
Yellow Pine									
Sugar "									
Entire Stand									
Yellow Pine									
Sugar "									
Entire Stand									
Yellow Pine									
Sugar "									
Entire Stand									
Yellow Pine									
Sugar "									
Entire Stand									
Lodgepole Pine									
Entire Stand									

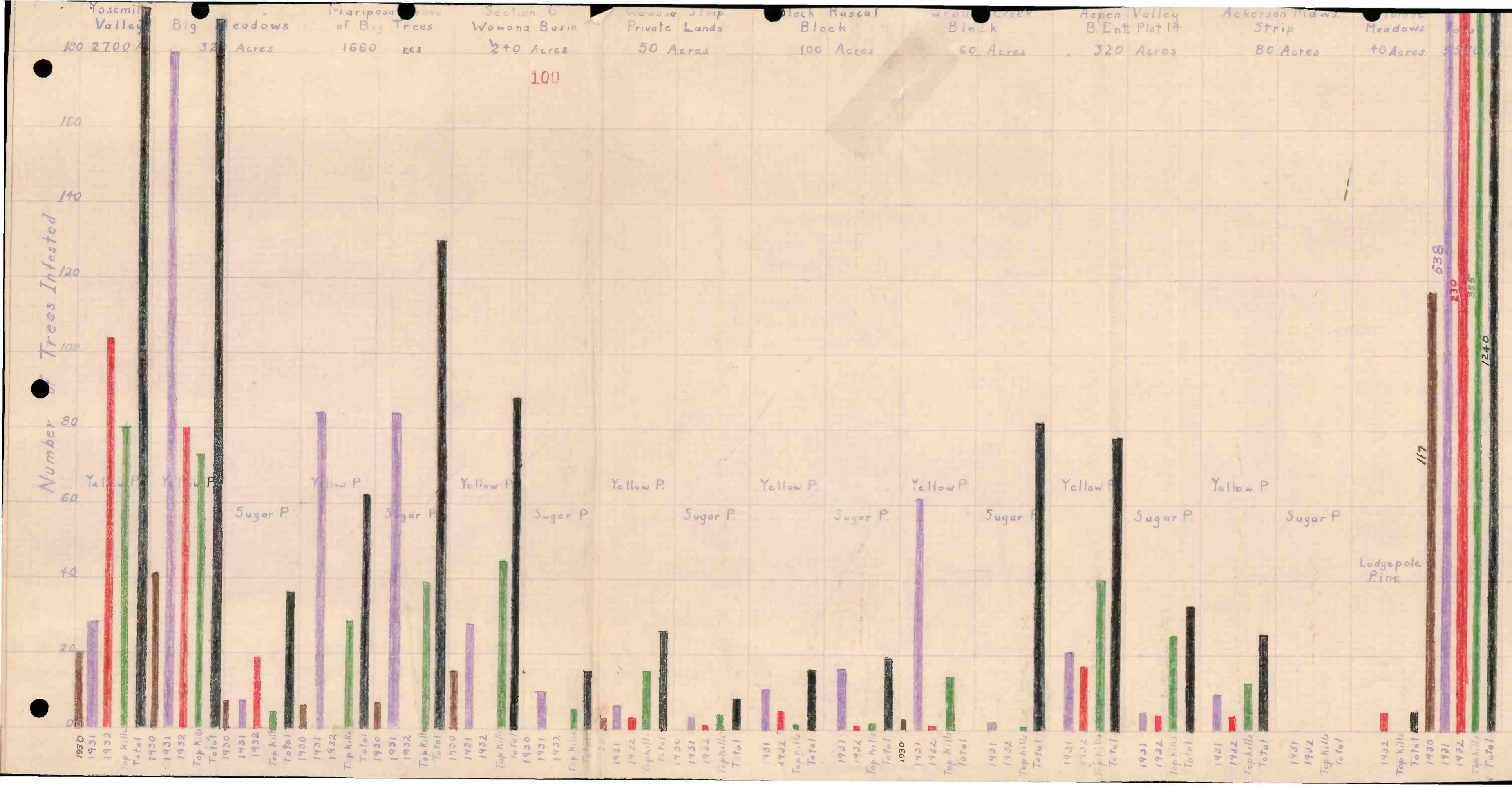
Chart Number Two

Number of Trees Infested

This chart shows the number of trees infested on the ten individual permanent sample plots. Each square represents two trees infested. The red represents trees killed so far this season with the total losses as yet indeterminate. The fall survey will pick up the losses for the season completely. The green represents the top-killed trees, some of which can be charged off as 1932 losses for the reason that they will fill in later during the season and be completely killed. The chart shows the great increase of 1931 losses over the losses for 1930. It shows the rise of the per cent of infestation from a purely normal or endemic percentage to that seriously approaching or having reached the epidemic stage. It must be remembered in this chart that on some of the plots the losses for 1930 were not determinable at the time the data was obtained, but in all cases where the 1930 losses were obtainable the infestation increase is striking.

The Yosemite Valley graph can not be held true because control and wood cutting operations have removed a large part of the 1931 losses. But at that the loss of 103 trees in the Valley in the one season of 1932 is a matter of great consequence. The percentage of loss in volume is negligible.

(Chart on following page)



PERMANENT SAMPLE PLOTS
INSECT INFESTATION SURVEY

YOSEMITE NATIONAL PARK, CALIF.

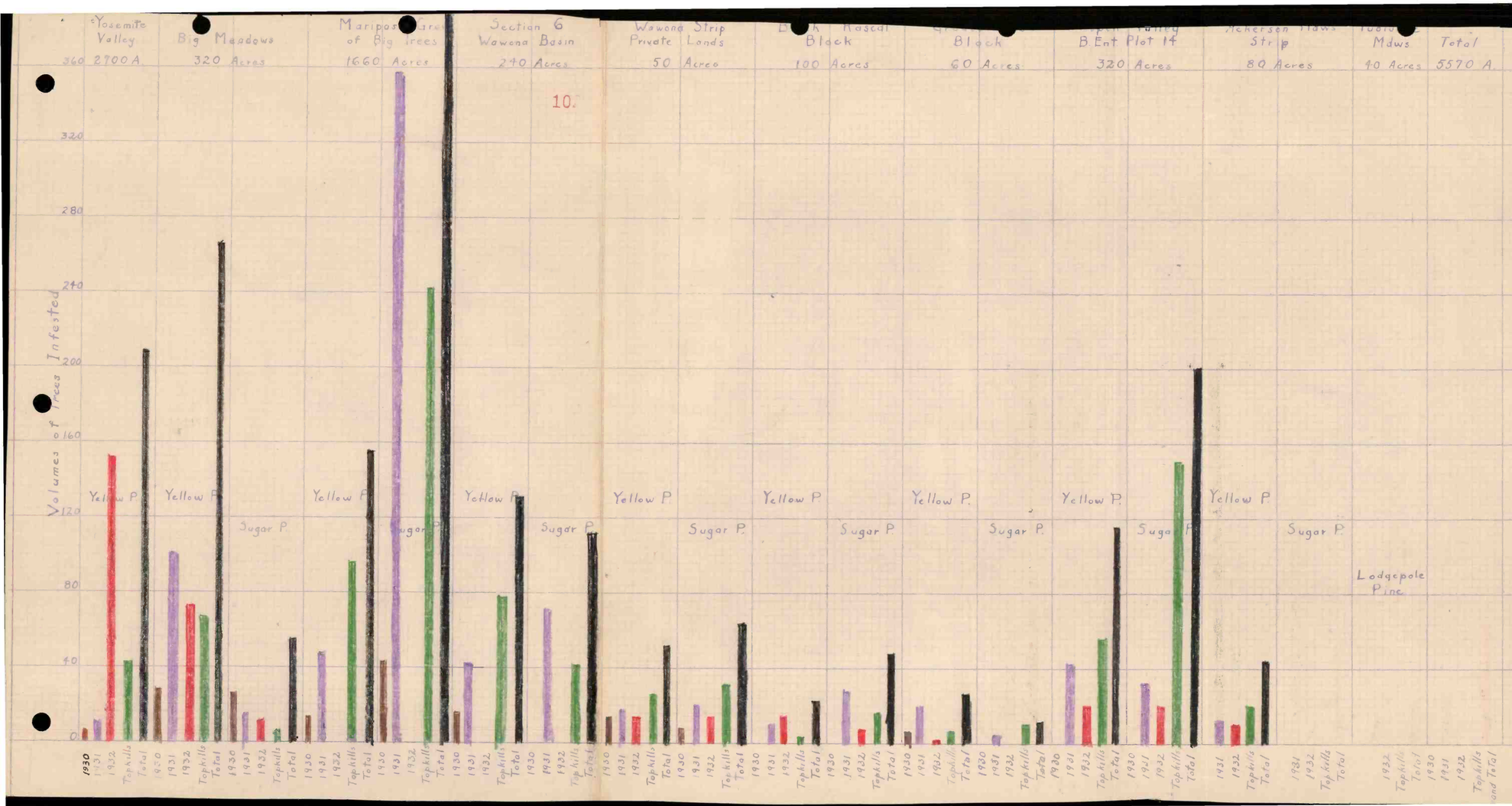
August, 1932. Emil Ernst

Chart Number Three

Volumes of Trees Infested

This chart shows the volumes of trees as found infested on the ten individual permanent sample plots. Each square represents a loss of 4,000 feet Board Measure based on the Scribner Decimal C Log Rule. The colors hold true as in the preceding chart. The volumes here were computed from the same data used on the preceding chart. It will be noted that the volumes are large in the aggregate, totaling for the ten sample plots 2,278,310 board feet. Spreading this over the area of 5,670 acres in the plots, it averages 400 board feet per acre. If this holds true for the entire 100,000 acres believed to be in the susceptible types, the loss will amount to 40,000,000 board feet of Ponderosa and Sugar Pine. These are losses from 1930 on to date, with the returns for 1932 far from complete.

(Chart on following page)



PERMANENT SAMPLE PLOTS

INSECT INFESTATION SURVEY

YOSEMITE NATIONAL PARK, CALIF.

August, 1932. Emil Ernst

□ = four thousand feet Board Measure

Chart Number Four

Average Diameter Breast High

This chart shows the average diameter of all of the trees found infested on the ten individual permanent sample plots. One square equals one inch of diameter D.B.H. (4 1/2 feet from the ground). The colors for the series are the same as in the preceding charts, with the exception of the black bar that represents the stand average. The stand average was obtained by averaging the diameters of the trees of the particular species in the green cruise. It will be noticed that in all cases the stand average is considerably below the infested averages, showing that the insects concentrate on the older and more than likely unhealthy trees.

(Chart on following page)

Private Lands 50 Acres | Block 100 Acres | Block 60 Acres | B. Ent. Plot 14 320 Acres | Strip 80 Acres | 40 Acres

PERMANENT SAMPLE PLOTS
INSECT INFESTATION SURVEY

YOSEMITE NATIONAL PARK, CALIF.

August, 1932 Emil Ernst

□ = One Inch in Dia.
Brown = 1930 Killed Trees
Violet = 1931 Killed Trees
Red = 1932 Killed Trees
Green = Top Killed Trees
Black = Stand Average

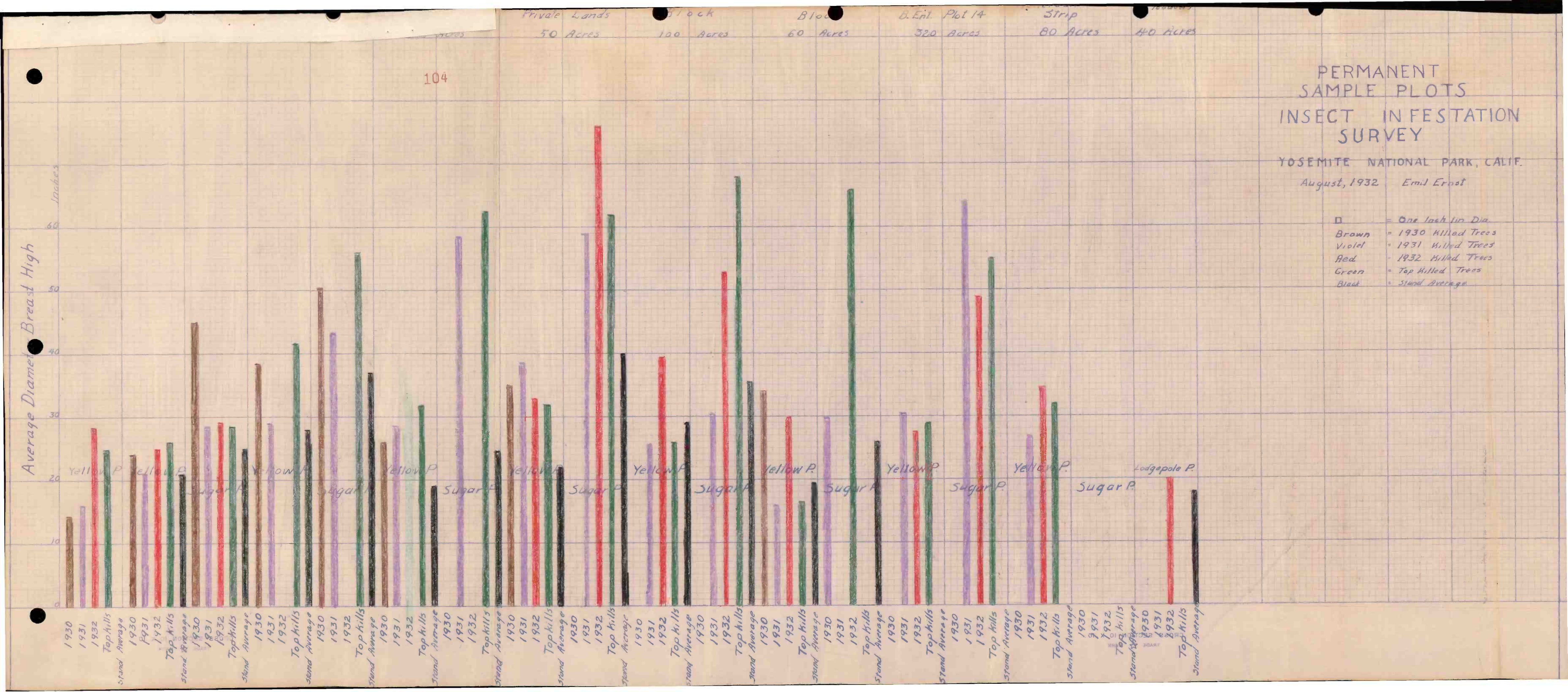


Chart Number Five

Average Board Foot Volume per Tree Infested

This chart shows the average board foot volume per tree infested on the ten individual permanent sample plots. Each square represents 250 board feet of volume. The colors remain the same for the series as in the preceding charts, with the exception that the black bar represents the average board foot volume per tree of the particular species in the green cruise of the stand. It is noticeable that the stand average is considerably below the infested averages, showing that the older and more than likely unhealthy trees are taking the greatest amount of losses.

(Chart on following page)

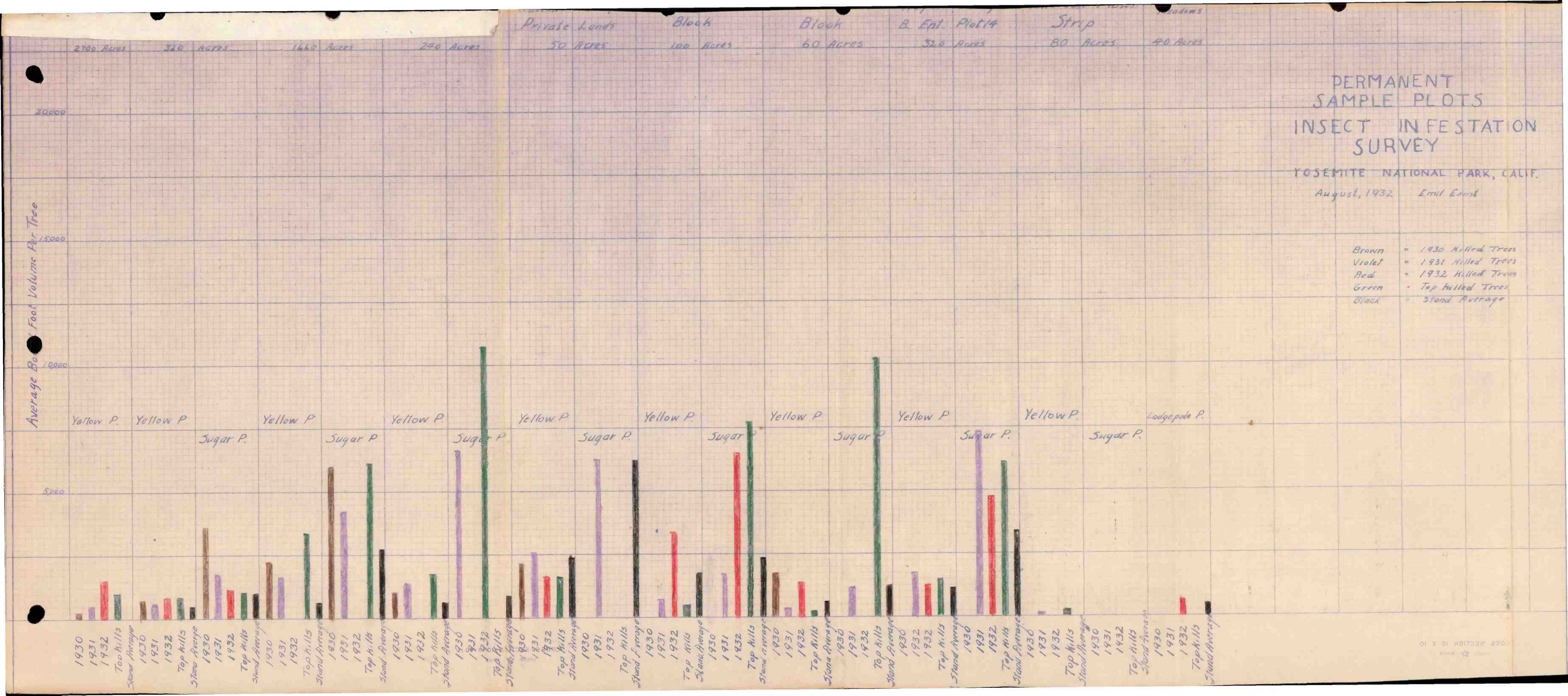

Private Lands
50 Acres
Block
100 Acres
Block
60 Acres
B. Est. Plot 14
320 Acres
Strip
80 Acres
40 Acres
2700 Acres
320 Acres
1660 Acres
240 Acres
PERMANENT
SAMPLE PLOTS
INSECT INFESTATION
SURVEY
YOSEMITE NATIONAL PARK, CALIF.
August, 1932 Emil Ernst
Brown = 1930 Killed Trees
Violet = 1931 Killed Trees
Red = 1932 Killed Trees
Green = Top Killed Trees
Black = Stand Average
Average Board Foot Volume Per Tree
20000
15000
10000
5000
Yellow P.
Sugar P.
Lodgepole P.
1930
1931
1932
Top Kills
Stand Average

Chart Number Six

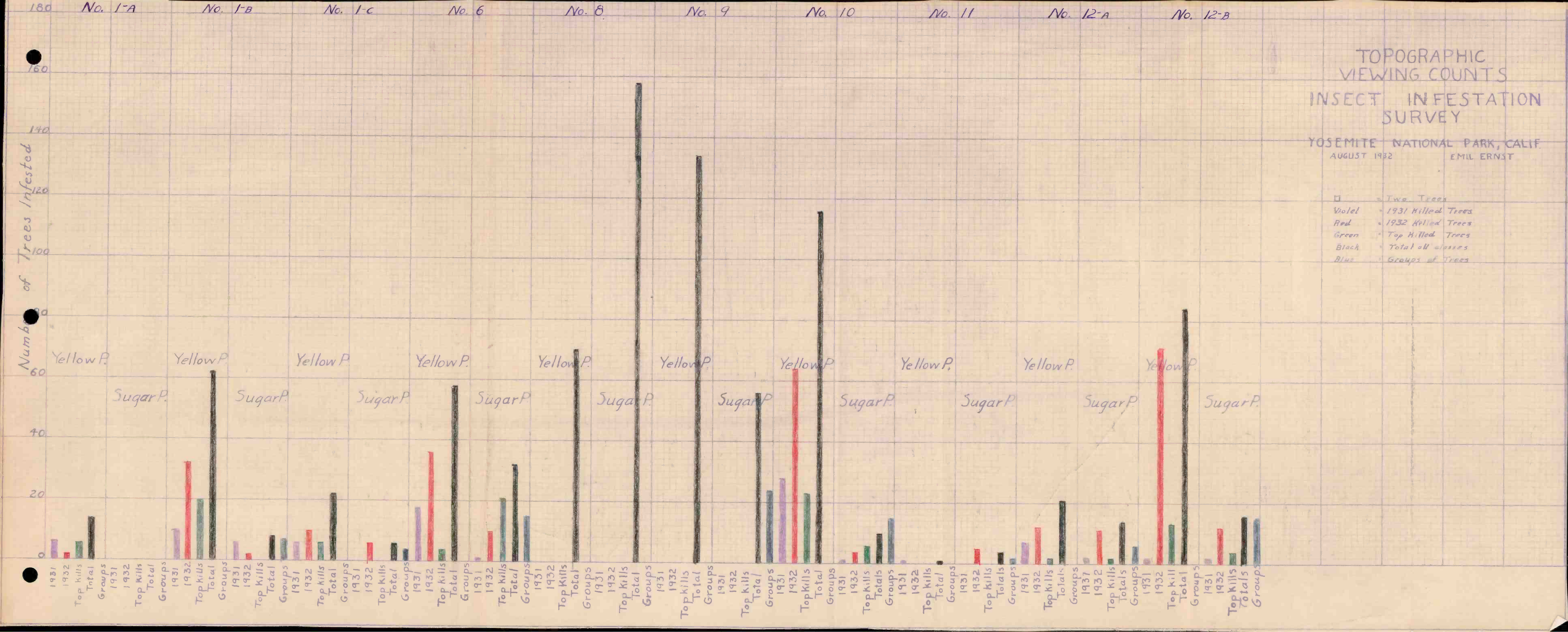
Topographic Viewing Counts

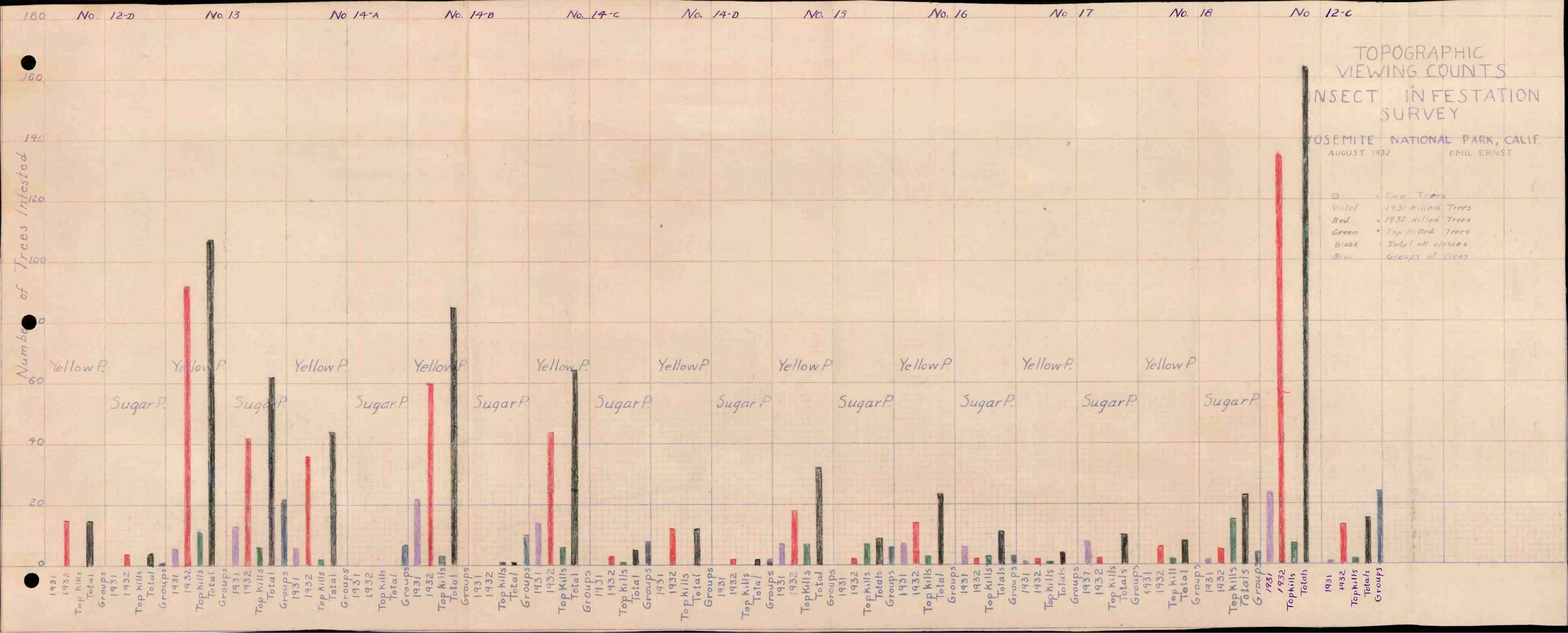
This chart shows the actual number of trees observed through the topographic viewing method of determining the losses from insect infestation. It is the quickest method of estimating the losses sustained in a stand. All the losses can not be seen because of topographic difficulties that one encounters in viewing any area from a distant point. There is always a certain per cent of the losses unobservable from any outside viewpoint that must be taken into consideration. This per cent of losses unobservable is taken care of by comparing the observed losses on the area viewed with the losses as actually found on a cruised area either within the viewed area or close to it giving the same appearance to the eye. This is really a correction factor that changes with each individual area viewed.

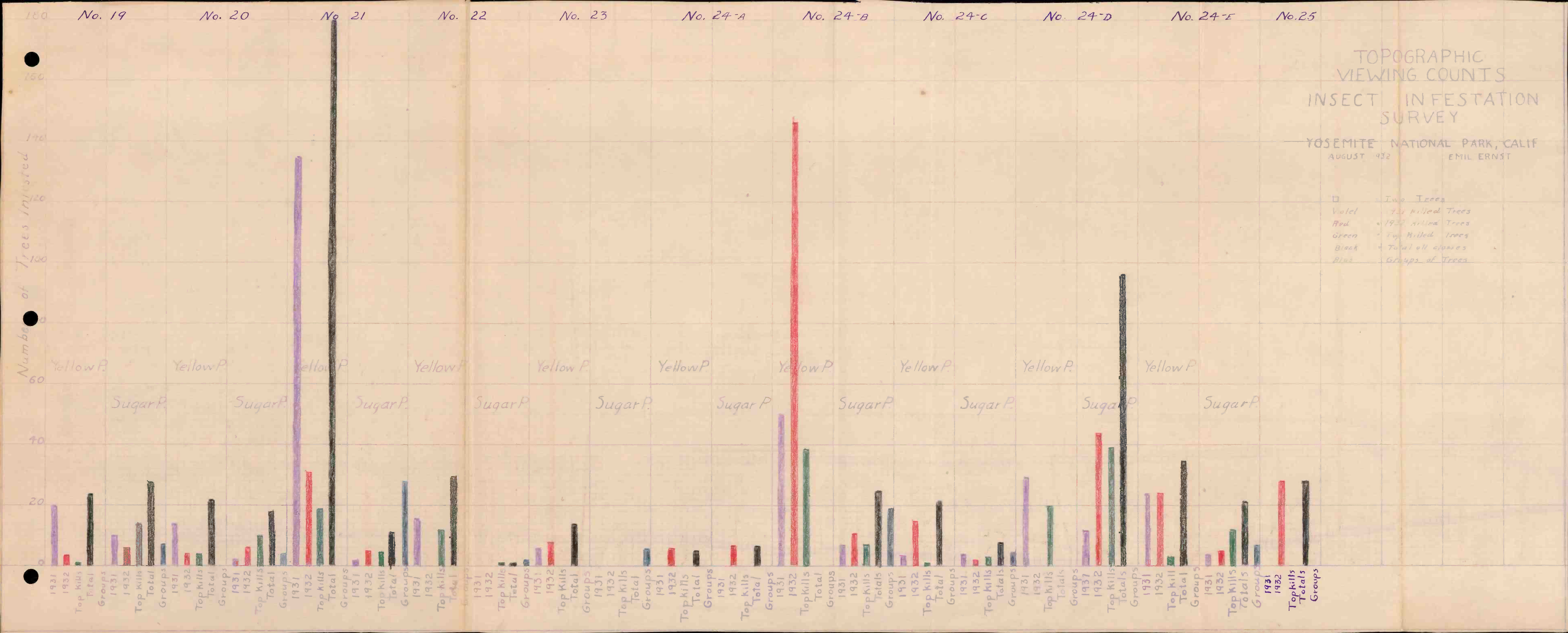
The method consists of selecting a point of vantage overlooking the area that is to be counted and then counting the discolored trees either by eye or with an enlarging optical instrument. In our case, a very powerful pair of stand binoculars, the property of the Yosemite Museum, were used and proved entirely satisfactory. The 20-power eye pieces were found to give the best results. The segregation of the counted trees into series may seem a little bit revolutionary under this system of estimating losses, but when a pair of binoculars such as described above are used, one can readily see why no hesitation can take place on the part of the observer when the tree happens to be within one mile of the observer.

The accompanying topographic map of the portion of Yosemite National Park thus viewed will show the location of the points of vantage found to give the best results, along with areas viewed and their number. Some points of vantage can cover only one area to advantage while others can cover two or more. This is shown by the arrows from the points of vantage to the areas viewed, each point with more than one area having a sub-designation of one of the letters of the alphabet; i.e., 2a, 2b, 2c, etc.

(Chart on following page)


No. 1-A
No. 1-B
No. 1-C
No. 6
No. 8
No. 9
No. 10
No. 11
No. 12-A
No. 12-B
TOPOGRAPHIC VIEWING COUNTS
INSECT INFESTATION SURVEY
YOSEMITE NATIONAL PARK, CALIF.
AUGUST 1932
EMIL ERNST
□ = Two Trees
Violet = 1931 Killed Trees
Red = 1932 Killed Trees
Green = Top Killed Trees
Black = Total all classes
Blue = Groups of Trees
Number of Trees Infested
Yellow P.
Sugar P.
1931
1932
Top Kills
Total
Groups


TOPOGRAPHIC
VIEWING COUNTS
INSECT INFESTATION
SURVEY
YOSEMITE NATIONAL PARK, CALIF.
AUGUST 1932 EMIL ERNST
□ = Live Trees
Violet = 1931 Killed Trees
Red = 1932 Killed Trees
Green = Top Killed Trees
Black = Total all classes
Blue = Groups of Trees
Number of Trees Infested
180
160
140
120
100
80
60
40
20
0
No. 12-D
No. 13
No 14-A
No. 14-B
No. 14-C
No. 14-D
No. 15
No. 16
No 17
No. 18
No 12-C
Yellow P.
Sugar P.
1931
1932
Top Kills
Total
Groups
Totals


No. 19
No. 20
No. 21
No. 22
No. 23
No. 24-A
No. 24-B
No. 24-C
No. 24-D
No. 24-E
No. 25
Number of Trees Infested
Yellow P.
Sugar P.
1931
1932
Top kills
Total
Groups
Totals
TOPOGRAPHIC
VIEWING COUNTS
INSECT INFESTATION
SURVEY
YOSEMITE NATIONAL PARK, CALIF
AUGUST 1932
EMIL ERNST
Violet = 1931 killed Trees
Red = 1932 killed Trees
Green = Top killed Trees
Black = Total of all classes
Blue = Groups of Trees

A totally killed Jeffrey Pine of the 1932 attack on the Big Oak Flat Road. The road embankment can be seen in the lower left foreground. Typical of the summer attacked trees which can be seen from great distances.

The Giant Yellow Pine, one of the attractions of Yosemite Valley, which is at present undergoing an attack by members of the bark beetle genus Dendroctonus. This famous old tree appears to be doomed.

Typical of the mixed conifer stands in the Rockefeller Purchase where Sugar Pine is the most important timber tree. This is the character of the timber thruout the entire purchase which cost $3,000,000. It is trees such as the large Sugar Pine on the left and the large Ponderosa Pines in the middle that are being so heavily infested by beetles of the genus Dendroctonus.

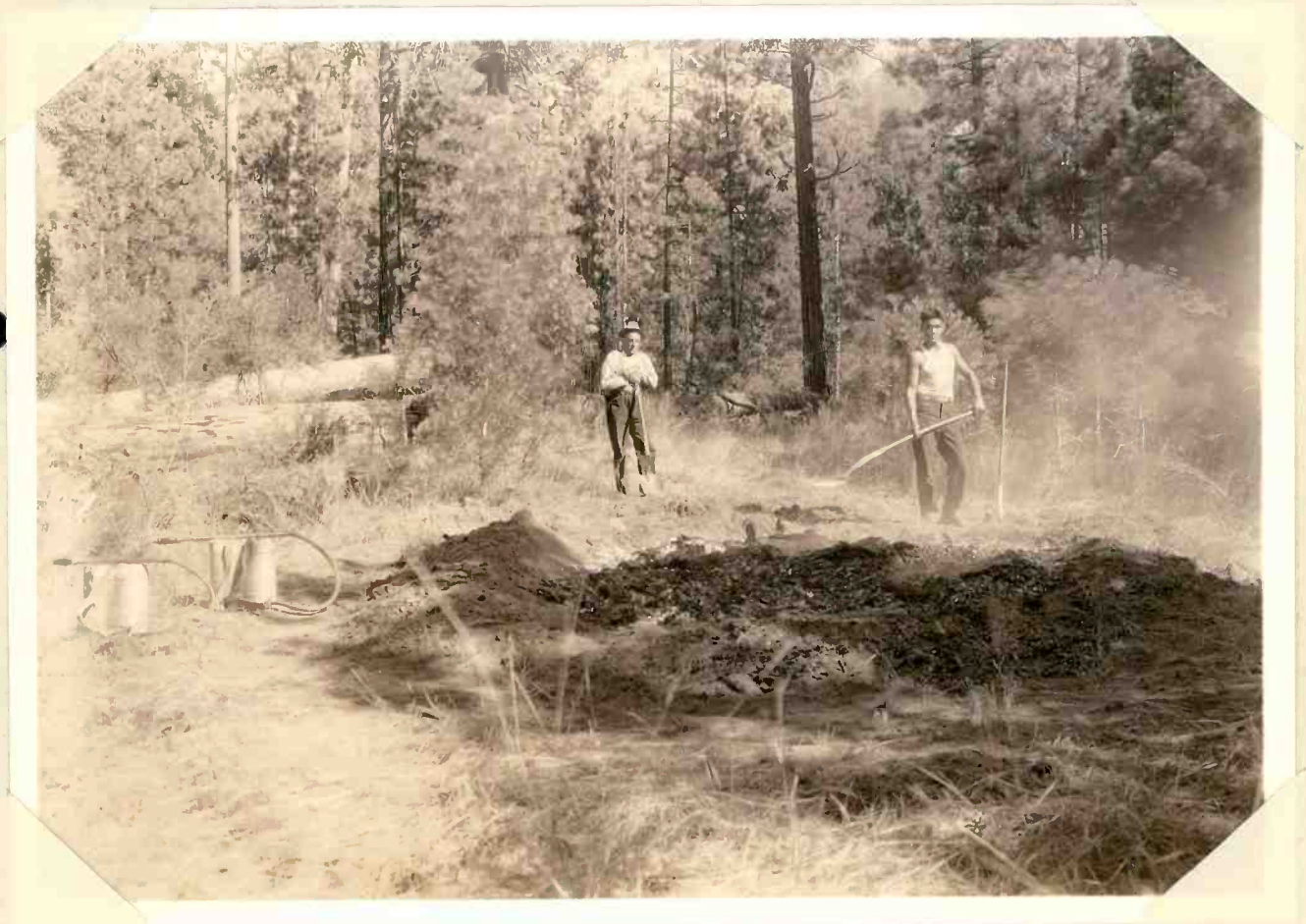
The slope east of Big Meadows with Big Crane Creek in the foreground. Showing the concentration and the tendency to group of the insect infestation in the Big Meadows unit. The tendency to group is considered a sympton of epidemic conditions. Insect infested show up by being lighter in color, the arrows indicate groups of insect infested trees.

A fire damaged Ponderosa Pine in the Big Meadows fire of July, 1931 showing the heavy Dendroctonus brevicomis concentration after the fire. The white spots on the trunk of the tree in the foreground are pitch tubes caused by the entrance of the bark beetles.

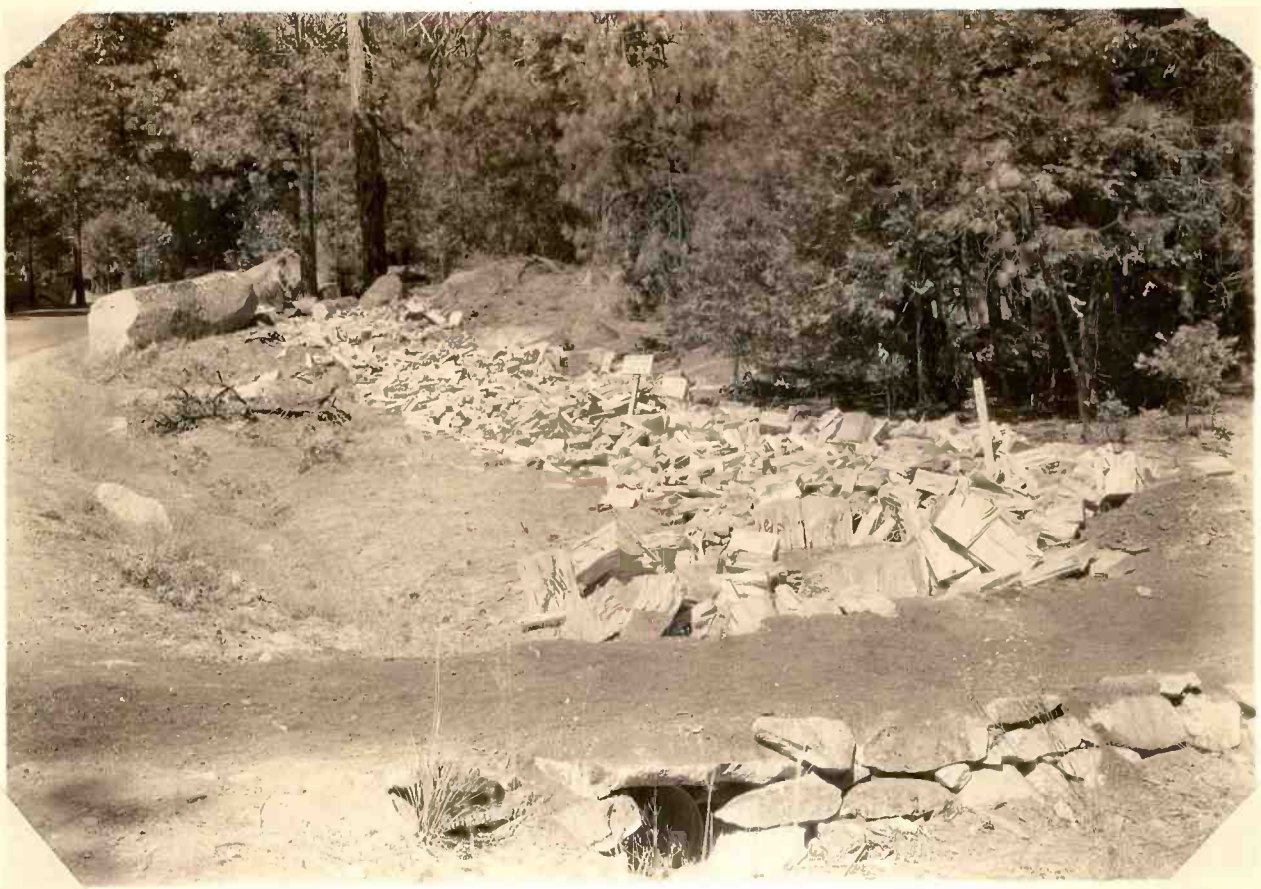
The epidemic attack upon the Sugar Pine by the Mountain Pine Beetle in the Aldar Creek Basin above the Ranger Station. This is an example of the view that greets all travellers from Yosemite Valley to the Mariposa Grove of Big Trees. The lighter colored trees are those being attacked by this very destructive beetle. This basin is considered as having the best stand of Sugar Pine in that section of the country, it was purposely left unlogged but the insects are doing as much damage as logging would do.

Ranger Charles Adair standing beside a large Sugar Pine felled for the treatment of the insect infested bark. It is not at all uncommon to fell trees such as this overmature apparently healthy Sugar Pine because of the attacks of the Mountain Pine Beetle (Dendroctonus monticola)

View of the area near the entrance to the Mariposa Grove of Big Trees as seen from the road. The lighter colored trees are those being killed by the Mountain Pine Beetle. The arrows indicate some of the trees.



The Pit Burning method of the disposal of insect infested bark as carried out in control work in Yosemite Valley. Due to the high fire hazard it is necessary to take added precautions in burning during the summer time. The high use value of Yosemite Valley compels summer control operations.



The follow up of insect control work in Yosemite Valley. The larger trees are used for the Government quarters wood supply while the limbs and smaller trees are left to the campers for their firewood. This is Tree number 157 thirty eight inches in diameter, eight logs in length giving 2900 feet of board measure in good Ponderosa Pine.